TERRARIUM

Grades 4-6

Note: The BPA volunteer needs to contact the teacher at least one week in advance so the teacher will have time to gather materials and to cut the two-liter bottles before the lesson.

Overview

Students identify their own basic needs in their habitat ***(home)***, food, water, shelter, and space. They then generalize that these needs or components of habitats are needed by all humans, animals, and even plants. They study the water cycle. Keeping these factors in mind, the students build a habitat for plants and insects in a terrarium that they make out of a two liter bottle. Using a science journal, they observe, take notes and draw the changes in the terrarium once a week.

Objectives

- The students will be able to identify the components of habitat: food, water, shelter and space.
- The students will be able to generalize that the components of habitat are needed by humans, animals, and plants.
- The students will be able to identify the key elements in the water cycle.
- The students will be able to identify and give at least one function for each of a plant's parts: leaves, roots, and stems.

Vocabulary

Photosynthesis: The process by which chlorophyll-containing cells in green plants convert light to chemical energy and release oxygen.

Terrarium: an enclosure where small plants or animals are kept.

Materials

For each group of 4 students:

- Science Journal for notes and art work
- clear plastic two-liter pop bottles or have one terrarium to a group, if the students sit in groups
- 4 scissors
- 4 plastic spoons
- 8 plants, 2 for each student or 2 per group (strawberry and mint plants work well)
- small rocks and pebbles
- bark pieces for decor
- potting soil, peat moss (and garden soil for the students who have earthworms)
- water
- 1 spray bottle (for students to share)
- 4 small earthworms: one per student (optional)
- leaves and grass clippings
- small slices of apples for the earthworms
- a small tub or container for distributing materials
- celery and food coloring for the plant experiment
- spring things (optional)
    - several stems and leaves containing aphids
    - ladybugs

Getting Ready

Have all materials on a table for students' easy assess. Cut the tops off the 2 liter bottles. Separate the dark colored bottom from the rest of the bottle. You may want to make a transparency of the background materials.

Procedures

Activity 1

Begin this lesson with the focus question below:

1. "If you had to stay inside your home for the rest of your life, think about 3 other things besides your shelter you must have to stay alive? Now some of you might be tempted to say my TV, or my computer game, etc., but realize long before these things were invented people were living in homes. "Assume that your home has sufficient air, heat and furnishings like dishes furniture, etc." "List 3 things you must have to stay alive." Give the students enough time to accomplish this. "Now share your list with your group." Each group needs to agree upon and make a list of the four most important things they need to stay alive.

2. Call on students for their answers and finally limit the list to food, water, shelter, and space. The students will probably not come up with space, but once you have the other three you can ask them if they could live in a three by three home.

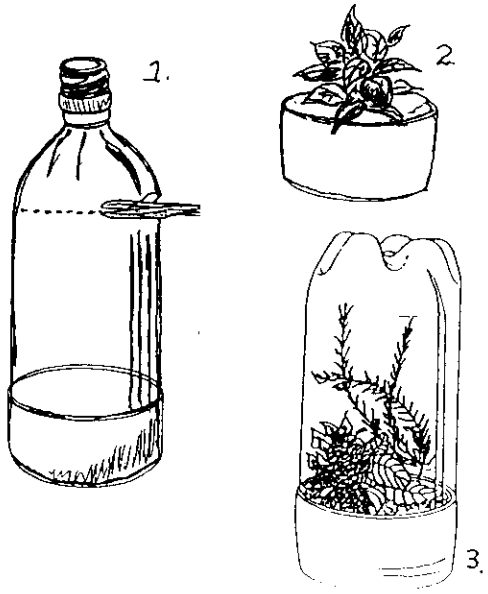
3. Tell the students that they are going to be making a terrarium. Observing this habitat, they will decide if plants and insects have the same basic needs as we do. But before they build their terrarium, they need some background knowledge. "We have listed our basic human needs. As I give you this background information be thinking about what are the plants' basic needs and how do these needs compare to ours? "Be ready to name the main parts of a plant and describe one function for each part."

Background

A well-established terrarium will require little maintenance because it sets up its own water cycle and climate. When the temperature in a terrarium increases, the ***water*** evaporates, and when the temperature decreases, the water condenses. The plants and insects continue to use the same water that was originally sprayed into the terrarium before it was sealed. The plants' green ***leaves*** contain chlorophyll, which help the leaves manufacture plant food in a process called photosynthesis. The plants' green leaves take in carbon dioxide from the air and absorb light from the sun, which aid in this process. The plants ***roots*** secure the plant in the ground and absorb minerals and water from the soil for plant growth. Certain plants' roots store food for the plant. ***Stems*** support and hold the leaves up so the leaves take in light and air. Some stems are used for storing food and water, and they contain numerous small tubes which carry water, food, and minerals to the plant's different parts. The plant needs ***space*** to either grow up or out to the sides.

Questions

"According to this information what are plants' basic needs?" Plants require space, sunlight, air, water, and some minerals to survive. Ask the students to name the main parts of a plant and give at least one function each part provides.



Steps for building the terrarium:

1. Hand out materials to the groups. They each will need a container of each of the materials. All the materials needed for 4 students go in a tub.
2. Place a layer of small rocks or pebbles in the bottom of the hard plastic base.
3. Add potting soil on top of the rock layer almost to the top of the base.
4. Using a plastic spoon, demonstrate for the students how to make small holes in the soil and carefully place the plants in the hole. Then gently, yet firmly they are to press the soil over the plants roots. (Two different plants make an interesting terrarium. If there are not enough plants for each child to have two plants, then have only one plant apiece.)
5. Have each student gently water his or her plants with the spray bottle.
6. Add some grass clipping, dried leaves, and one small earthworm.
7. They can add a few small interesting rocks and bark pieces.
8. Add the leaves with aphids and the ladybugs.
9. Turn the clear plastic bottle upside down and secure it inside the dark plastic base.
10. Add additional water to the terrariums if needed, but students are to strive for the correct amount so that the atmosphere is in balance.

Explain to the students that their plants need light, but they should not be placed in direct sunlight.

Activity 2 Plant Experiment

Place some celery in colored water. Ask the students to predict what they think will happen. Using their science journals, have them draw and color the celery as it appears when it is first placed in the colored water; and then draw and color a picture of it again at the end of the day or the next day. Ask the students what happened to the celery, and why did this happen? (The plant's inner tubes carry the colored water up through the stem to the leaves. The leaves take on the color of the colored water.)

Closure

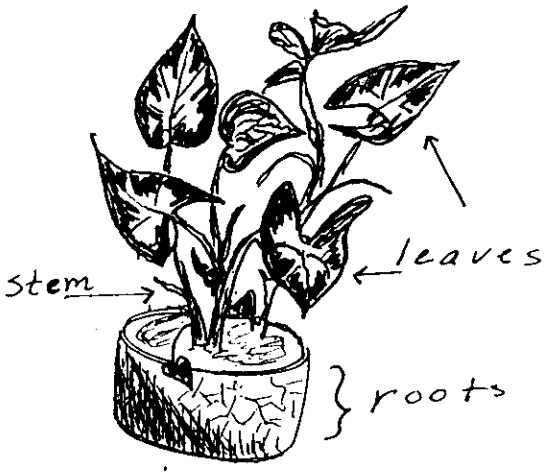
The students fill out the worksheet on terrariums. (see attached)

Clean Up

The classroom needs to be left just as it was.

Supplementary Activities

1. Have students journal daily or at least three times a week.
2. Show a film on photosynthesis and plants.
3. Have them draw a picture of their terrarium from the viewpoint of an earthworm.
4. Have a few students set up a habitat just for earthworms; this could be in a large plastic jar with alternating layers of garden soil or peat moss and sand. Potting soil is not recommended. The layers should be thick enough to be obvious and easy to observe. Having magnifying lenses nearby is important. Add grass, dead leaves, and some small slices of apple. Students can research and give a report on earthworms including a detailed drawing.
5. Some students could set up a ladybug habitat in a large clear plastic container. The students would place several leaves and stems covered with aphids inside it, add the ladybugs and cover the jar with a nylon stocking held in place with a rubber band. Mist the leaves daily with a gently spray bottle. Students can research and give a report to the class. Their report should include the following information: the female ladybug lays yellow or orange eggs on the stems or under the leaves of plants infested with aphids. In about two days, the eggs hatch into larvae that are 1/3 of an inch long, and the larvae eat the aphids. The larva eventually attaches itself to a leaf and becomes a pupa in five to seven days.



Terrariums **Name** _____ **Date** _____

Today on this date _____, I created a terrarium.

The plant or plants in my terrarium are

_____

_____

Other living things in my terrarium are

_____

_____

_____

The non living items in my terrarium are

_____

_____

Plants require the following to live:

_____

_____

Plant food is manufactured by a plant's green leaves, which contain chlorophyll and oxygen is given off in a process called

_____

Each part of a plant has important functions, and I will name one function for each part.

The plant's leaves

_____

_____

The plant's stem

_____

_____

The plant's roots

_____

_____

Challenge: After researching terrariums, I learned:

_____

_____

_____